



Cleaning Recommendations on OM 100 Revision II – November 2004

General Product Description

We have developed OM 100 through a desire for an opaque quartz glass with properties superior to those of standard available materials. The innovative manufacturing process results in not only enhanced capacity but also in a much smoother surface finish and high purity. The OM 100 manufacturing process does not produce round bubbles but rather very fine irregularly shaped micropores, which scatter irradiation in a highly efficient way.

OM 100 has a density of 2.15 – 2.18 g / cm³ a value extremely near to that of transparent quartz glass. Even though the total porosity volume is very low and much less than in conventional materials, there are inevitably micropores near the surface which must be taken into account when OM 100 is machined or cleaned.

General Aspects

When machining OM 100 (e.g. milling or cutting), abrasives, polishing agents and coolants or cooling oil (processing materials) will be typically employed, and molecules of these processing materials can settle in the micropores of OM 100. If these residues are not being removed before the further machining of OM 100, black spots can appear on OM 100 during annealing or fire-polishing, which spoil the OM 100. Also during the cleaning process itself, residues of the cleansing agent can settle in the micropores of OM 100 when the cleaning is conducted improperly. Failure to remove the residues of the cleansing agent before the further annealing or fire-polishing of OM 100 can also lead to the appearance of black spots during annealing or fire-polishing.

Since we deliver OM 100 to you as base material and do not machine this material ourselves, you will be entirely responsible for the proper removal of processing materials and also for the proper removal of cleansing agents before the further machining of OM 100. However, since we do not sell only unmachined opaque quartz glass but also machined opaque quartz glass, we

have gathered experience in the cleaning of opaque quartz glass within our own organization, which we wish to pass on to our customers for opaque quartz glass.

Following is a description of two cleaning methods which we would like to introduce to you. However, depending on your individual production conditions and the abrasives, polishing agents, coolants and cooling oils used by you, it cannot be ruled out that these cleaning methods cannot be successfully employed by you, or only with certain variations. We therefore recommend that you test the cleaning methods proposed by us on a sample or single part. Following is a short description of the two proposed cleaning methods:

Cleaning Method ① for OM 100 Parts:

- Surface wipe with alcohol
- Ultrasonic clean for at least 10 minutes at 80°C in a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500
- Manual surface clean at 80°C with a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500 using a clean sponge
- Ultrasonic clean for at least 5 minutes at 80°C in a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500
- Rinse intensively in DI water
- Etch in HF acid (loss of substance 0.4 – 0.6 µm)
- Rinse intensively in DI water
- Ultrasonic clean for at least 10 minutes at 80°C in a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500
- Manual surface clean at 80°C with a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500 using a clean sponge
- Rinse in DI water for at least 10 minutes with 1 minute cycle time
- 5 Minutes after cleaning test if surface is pH neutral: pH-measurement with litmus paper
- Dry for 240 – 480 minutes at 80°C (goal: residual moisture 0%)

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Please note that OM 100 quartz must not be allowed to dry completely until it has been thoroughly cleaned. In case that you should interrupt the cleaning process, keep the OM 100 parts in DI water with dish washing liquid (pH neutral), ratio 1:500.

Cleaning Method ② for OM 100 Parts:

1. Machine Cleaning:

Clean OM 100 parts after grinding in an industrial cleansing machine. We are using a standard industrial cleansing machine. The cleansing machine program should include several cleansing and rinsing steps, which are as follows:

- Cleansing with an alkaline cleansing agent, ratio 1:500 for 20 minutes at 90°C
- Neutralization in a low citric acid solution for 5 minutes at 60°C
- Final rinsing in DI water for 5 minutes at 60°C

After completion of the machine cleaning, the OM 100 parts must be submitted to a visual inspection. The machine cleaning process must be repeated for so long (maximum 3 times) until no impurities are visible anymore.

2. Ultrasonic Cleaning:

The optically clean OM 100 parts are being placed in plastic baskets and cleaned ultrasonic cleaning bath as follows:

- first time (or in the first chamber): ultrasonic chamber charged with, a mixture of DI water and dish washing liquid (pH neutral), ratio 1:500, bathing temperature: 70°C, exposure to ultra-sound waves: 3 minutes
- subsequent 4 times (or in the subsequent 4 chambers): rinsing chambers charged with DI water, bathing temperature: 2 x 60°C and 2 x room temperature

3. Cleaning with Acid Solution:

The baskets with the OM 100 parts from the ultrasonic cleaning bath are being dipped in an etching solution (5% HF + 5% HNO₃), loss of substance 0,4 - 0,6 µm and subsequently rinsed intensively in DI water for 10 minutes. 5 minutes after cleaning test if surface is pH neutral: pH-measurement with litmus paper.

4. Drying:

Dry for 240 - 480 minutes at 80°C
(goal: residual moisture 0%).

Should you have any questions on the cleaning methods described above, please do not hesitate to contact your contact person in our customer service department or send an email to sales.basematerials@heraeus-quarzglas.com.

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